Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Please cancel claims 1-40 and 46-56 without prejudice; and add new claims 57-77 as follows.

1-40. (canceled)

41. (original) A method for fitting a three-dimensional target profile, the method comprising:

providing a two-dimensional basis function including overlapping portions to represent a three-dimensional profile which has symmetry with respect to a two-dimensional section extending along a treatment pattern; and

fitting the three-dimensional target profile with the two-dimensional basis function to obtain a distribution of the overlapping portions.

42. (original) The method of claim 41 wherein the three-dimensional profile has symmetry with respect to a two-dimensional section oriented radially from an axis of symmetry and extending in a generally circular treatment pattern around the axis.

43. (original) The method of claim 42 wherein the overlapping portions are generally circular, and the two-dimensional basis function comprises discrete basis functions each representing a coverage angle of one of the overlapping portions as a function of a distance from the axis of symmetry.

44. (original) The method of claim 41 wherein the three-dimensional profile has symmetry with respect to a two-dimensional section oriented normal across a generally straight treatment pattern.

45. (original) The method of claim 44 wherein the overlapping portions are generally circular, and the two-dimensional basis function comprises discrete basis functions each representing a depth of one of the overlapping portions as a function of a distance from the axis of symmetry.

46-56. (canceled)

57. (new) The method of claim 41 wherein the basis function includes *M* discrete basis functions representing *M* overlapping portions.

58. (new) The method of claim 57 wherein the *M* discrete basis functions represent *M* overlapping portions across a treatment zone length representing the length across a generally two-dimensional section which is oriented normal across a generally straight treatment pattern or which is oriented radially across a generally circular treatment pattern.

59. (new) The method of claim 58 wherein the overlapping portions are generally circular and have a generally uniform energy profile.

60. (new) The method of claim 59 wherein

(A) for a treatment profile having a generally uniform two-dimensional section oriented normal across a generally straight treatment pattern, the discrete basis functions represent the two-dimensional section as

$$X_i(x_j) = y_i(x_j) = \sqrt{(s/2)^2 - (x_j - x_{0i})^2} \text{ or}$$

(B) for a treatment profile having a generally uniform two-dimensional section oriented radially across a generally circular treatment pattern, the discrete basis functions represent the two-dimensional section as

$$X_i(x_j) = \theta_i(x_j) = \cos^{-1}\left(\frac{x_j^{\,2} + x_{0i}^2 - (s/2)^2}{2 \cdot x_{0i} \cdot x_j}\right)$$

where

s is the diameter of the overlapping portion;

$j = 1, \ldots, N$;

x_j is a reference x-coordinate for the two-dimensional section measured from an optical axis of the cornea of a j^{th} evaluation point for the center of the overlapping portion;

x_{0i} is an x-coordinate for a center of an i^{th} overlapping portion;

$(x_{0i} - s/2) \leq x_j \leq (x_{0i} + s/2)$;

$y_i(x_j)$ is a depth of the i^{th} basis function for the generally straight treatment pattern; and

$\theta_i(x_j)$ is a coverage angle of the i[th] basis function for the generally circular treatment pattern.

61. (new) The method of claim 60 wherein x_{0i} is specified for M number of equally spaced overlapping portions as $x_{0i} = i * [(L - s + e) / M]$,

where

L is the treatment zone length;

e is an extended zone; and

$i = 1,\ldots,M$.

62. (new) The method of claim 61 wherein e is set to about 0.1 to about 0.5 mm.

63. (new) The method of claim 57 wherein M is equal to about 7 to about 97.

64. (new) The method of claim 57 further comprising refitting the target function with the basis function by varying the number of overlapping portions M to iterate for a best fit.

65. (new) The method of claim 41 wherein the target function is:

(A) for myopia and myopic cylinder,

$$f(x_j) = \sqrt{R_1^2 - x_j^2} - \sqrt{\left(\frac{R_1(n-1)}{n-1+R_1 D}\right) - x_j^2} + C \text{ or}$$

(B) for hyperopia and hyperopic cylinder,

$$f(x_j) = R_1 - \frac{R_1(n-1)}{n-1+R_1 D} - \sqrt{R_1^2 - x_j^2} + \sqrt{\left(\frac{R_1(n-1)}{n-1+R_1 D}\right) - x_j^2} \text{ or}$$

(C) for phototherapeutic keratectomy,

$f(x_j) = d$;

where

$0 \leq x_j \leq (L - shift)$;

$j = 0,1,\ldots,N-1$;

$$C = \sqrt{R_1^2 - s^2/4} + \sqrt{\left(\frac{R_1(n-1)}{n-1+R_1 D}\right) - s^2/4};$$

x_j is an x-coordinate measured from an optical axis of the cornea of the j[th] evaluation point for the center of the overlapping portion;

s is the diameter of the overlapping portion;

R_1 is the anterior radius of curvature of the cornea in meters;

R_2 is the final anterior radius of curvature of the cornea in meters;

$n = 1.377$ is the index of refraction of the cornea;

D is the lens power of the overlapping portion in diopters;

L is the treatment zone length representing the length across a generally uniform section which is oriented normal across a generally straight treatment pattern for myopic or hyperopic cylinders, or which is oriented radially across a generally circular treatment pattern for myopia or hyperopia;

shift is the amount of emphasis shift; and

d is a constant depth.

66. (new) The method of claim 65 wherein the shift is about 0 to about 0.2.

67. (new) The method of claim 65 wherein $x_j = j * [\,(L - shift) / N\,]$.

68. (new) The method of claim 65 wherein the basis function includes M discrete basis functions representing M overlapping portions, and wherein fitting the target function with the basis function comprises solving the following equation for coefficients a_i representing treatment depth for the i[th] overlapping portion:

$$f(x_j) = \sum_{i=1}^{M} a_i X_i(x_j)$$

where

$X_i(x_j)$ is the i^{th} basis function; and

$i = 1, \ldots, M.$

69. (new) The method of claim 41 wherein fitting the target function and the basis function comprises specifying a deviation for each of the N discrete evaluation points.

70. (new) The method of claim 69 further comprising refitting the target function with the basis function by varying the deviations to iterate for a best fit.

71. (new) The method of claim 41 wherein fitting the target function and the basis function comprises evaluating closeness of the fit and repeating the fitting step if the closeness does not fall within a target closeness.

72. (new) The method of claim 41 wherein the target function and the basis function are fitted using a least square fit.

73. (new) The method of claim 41 further comprising refitting the target function with the basis function by varying the size of at least one of the overlapping portions to iterate for a best fit.

74. (new) The method of claim 41 wherein the overlapping portions have different sizes.

75. (new) The method of claim 41 wherein the target function and the basis function are fitted using a simulated annealing process.

76. (new) The method of claim 41 further comprising specifying a merit function representing an error of fit between the target function and the basis function; and minimizing the merit function.

77. (new) The method of claim 41 further comprising refitting the target function with the basis function by selecting an overlapping portion location and varying the characteristics of the overlapping portion at the selected location to iterate for a best fit.